

State a value that makes the ordered pair a solution of the given equation.

1. $3x - 2y = 18$

$(-2/3, \underline{-10})$

2. $x - 4y = -12$

$(\underline{-10}, 1/2)$

Find the x- and y-intercepts for each equation.

3. $4x + 5y = 20$

x-intercept: $(\underline{5}, \underline{0})$

y-intercept: $(\underline{0}, \underline{4})$

4. $2x - y = 8$

x-intercept: $(\underline{4}, \underline{0})$

y-intercept: $(\underline{0}, \underline{-8})$

Write an equation in slope-intercept form that meets the following conditions.

5. Has an x-intercept of 5 and a y-intercept of 7

$y = -\frac{7}{5}x + 7$

6. Has the same slope as $2x + 3y = 9$ and the same y-intercept as $3x - 4y = 12$

$2x + 3y = 9$
 $\frac{3}{3}y = -\frac{2}{3}x + \frac{9}{3}$
 $y = -\frac{2}{3}x + 3$

$y = -\frac{2}{3}x - 3$

7. Is perpendicular to $y = \frac{1}{2}x + 5$ and contains $(-3, 1)$

$y - 1 = -2(x + 3)$
 $y - 1 = -2x - 6$
 $y = -2x - 5$

8. Is parallel to $4x + 2y = 5$ and passes thru $(3, -2)$

$\frac{2}{2}y = -\frac{4}{2}x + \frac{5}{2}$
 $y = -2x + 2.5$
 $y + 2 = -2(x - 3)$
 $y + 2 = -2x + 6$
 $y = -2x + 4$

Write an equation in point-slope form for each of the following.

9. $m = 3$ $(4, -5)$

$y + 5 = 3(x - 4)$
 $y + 5 = 3x - 12$
 $y = 3x - 17$

10. $(4, 7)$ and $(-2, -5)$

$\frac{-12}{-6} = 2$
 $y - 7 = 2(x - 4)$
 $y - 7 = 2x - 8$
 $y = 2x - 1$

11. Write a linear model.

Whether you are climbing a mountain or flying an airplane, the higher you go, the colder the air gets. At 1000 ft, the temperature is 13°C . At 3000 ft, the temperature is 9°C .

a. Write the ordered pairs. $(1000, 13), (3000, 9)$

b. Find the slope.

$$-\frac{1}{500}$$

$$y - 13 = -\frac{1}{500}(x - 1000)$$

c. Find the y-intercept.

$$15$$

d. Write the linear model.

$$y = -\frac{1}{500}x + 15$$

e. Find the temperature at 5000 ft.

$$y = -\frac{1}{500}(5000) + 15$$

$$y = -10 + 15 \quad y = 5^{\circ}$$

12. If $f(x) = -3x + 1$ and $g(x) = x^2$, evaluate each of the following.

a. $f(-6) = 19$
 $-3(-6) + 1$

b. $g(-4) = 16$
 $g(-4) = (-4)^2$
 $g(-4) = 16$

c. $f(5) - g(3) = -23$
 $(-14) - (9) = -23$

State the vertex and equation for the axis of symmetry.

13. $y = |x - 5| + 4$

Vertex: $(5, 4)$
 Axis of Symmetry:
 $x = 5$

14. $f(x) = |2x - 6|$

Vertex: $(3, 0)$
 Axis of Symmetry:
 $x = 3$

15. $y = \frac{1}{2}|x + 3| - 8$

Vertex: $(-3, -8)$
 Axis of Symmetry:
 $x = -3$

Write an absolute value function whose graph represents the following.

16. a translation 3 units to the left and 4 units down from the parent graph of $y = |x|$

$$y = |x + 3| - 4$$

17. is wider than the parent graph and 2 units up from the parent graph of $y = |x|$

$$y = \frac{1}{2}|x| + 2$$

Advanced Algebra Review
Assignment # _____

Name Key

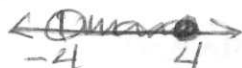
Solve each inequality.

1. $-10 < 3x + 2 \leq 14$

$-2 \quad -2 \quad -2$

$-12 < 3x \leq 12$

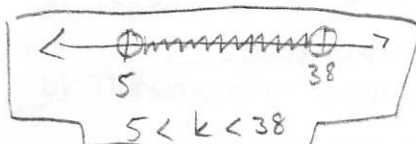
$-4 < x \leq 4$



(Draw a graph to determine each solution. Write the simplest solution.)

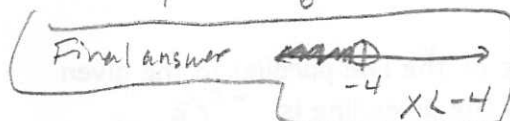
3. $2k > 10$ and $k - 8 < 30$

$k > 5$ and $k < 38$



5. $5x < -20$ and $\frac{1}{2}x < 3$

$x < -4$ and $x < 6$

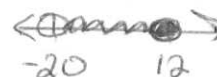


2. $-5 \leq 1 - \frac{1}{2}x < 11$

$-6 \leq -\frac{1}{2}x < 10$

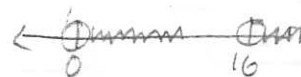
$12 \geq x > -20$

$-20 < x \leq 12$

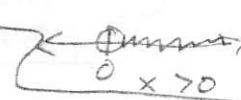


4. $\frac{3}{4}x - 2 > 10$ or $3x > 0$

$\frac{3}{4}x > 12$ or $x > 0$
 $x > 16$



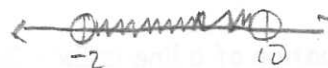
Final answer



6. $2 - 3a < 8$ or $x < 10$

$-3a < 6$

$a > -2$ or $x < 10$



All reals

Solve the absolute value equations. (Remember: TWO equations are needed. See pp. 33-34 examples 1-3)

7. $|2x - 3| = 17$

$2x - 3 = 17$

$2x - 3 = -17$

$2x = 20$

$2x = -14$

$x = 10$

$x = -7$

8. $|3x - 1| + 10 = 25$

$|3x - 1| = 15$

$3x - 1 = 15$

$3x - 1 = -15$

$3x = 16$

$3x = -14$

$x = \frac{16}{3}$

$x = -\frac{14}{3}$

9. $-2|x + 1| = 10$

$|x + 1| = -5$

No sol.

10. $3|4w - 1| - 5 = 10$

$3|4w - 1| = 15$

$|4w - 1| = 5$

$4w - 1 = 5$

$4w - 1 = -5$

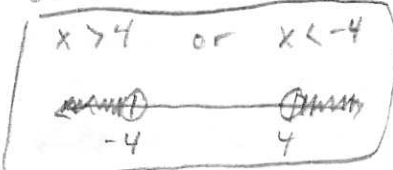
$4w = 6$
 $w = \frac{3}{2}$

$4w = -4$
 $w = -1$

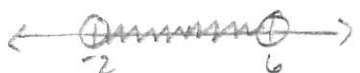
$w = \frac{3}{2}$ $w = -1$

Solve the absolute value inequalities. (Remember: Use a graph to determine the solution.)

11. $|5x| > 20$

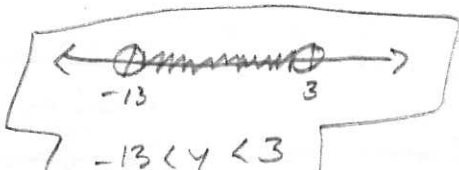
$5x > 20$ or $5x < -20$
 $x > 4$ or $x < -4$


12. $|x - 2| > -4$

$x - 2 > -4$ or $x - 2 < 4$
 $x > -2$ or $x < 6$
 All reals

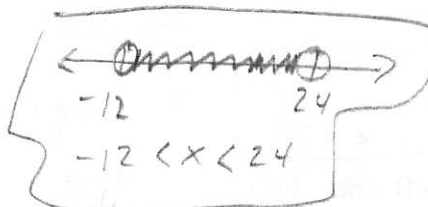
13. $|y + 5| < 8$

$y + 5 < 8$ and $y + 5 > -8$
 $y < 3$ and $y > -13$


 $-13 < y < 3$

14. $|3 - \frac{1}{2}x| < 9$

$3 - \frac{1}{2}x < 9$ and $3 - \frac{1}{2}x > -9$
 $-\frac{1}{2}x < 6$ and $-\frac{1}{2}x > -12$
 $x > -12$ and $x < 24$


 $-12 < x < 24$

Solve.

15. If the slope of a line is 5, then the slope of the line parallel to it is 5 and the slope of the line perpendicular to it is -1/5.

16. If the equation of a line is $2x - 5y = 10$, then the slope of the line parallel to the given line is 2/5 and the slope of a line perpendicular to the given line is -5/2.

$-5y = -2x + 10$
 $y = \frac{2}{5}x - 2$

17. The general form of an absolute value function is $y = a|x + b| + c$.
 The general form of the vertex of an absolute value function is $(-b, c)$.
 The equation of the axis of symmetry for an absolute value function is $x = -b$.

18. The vertex of $y = |3x + 6| - 8$ is $(-2, -8)$.

The equation for the axis of symmetry is $x = -2$.

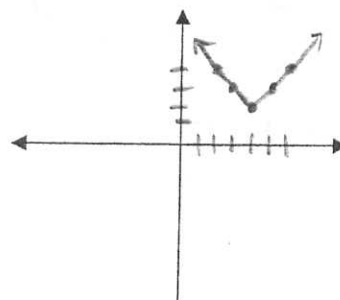
$3x + 6 = 0$

$y = 3|x + 2| - 8$

19. Make a T-chart and graph:

$y = |x - 4| + 2$

x	y
2	4
3	3
4	2
5	3
6	4



To find x value, set inside of abs val. equal to 0.

1. State the domain and range of the relation.

$$\{(5, 4), (3, -2), (5, -2)\}$$

Domain: $\{3, 5\}$ Range: $\{-2, 4\}$

2. Is the relation in problem 1 a function? Explain why or why not.

No, the domain of 5 is paired with more than one range (-2 and 4)

3. The equation of a line is
- $4x + 3y = 15$
- .

a) The ordered pair of the x-intercept of the line is $(3.75, 0)$

$$3y = -4x + 15$$

b) The slope of a line parallel to the above line is $-4/3$

$$4x + 3(0) = 15$$

$$4x = 15$$

$$x = 3.75$$

c) The slope of a line perpendicular to the above line is $3/4$

4. Write the equation a line in slope-intercept form that has a slope of
- $2/3$
- and contains
- $(-4, 7)$
- .

$$y - 7 = \frac{2}{3}(x + 4)$$

$$y - 7 = \frac{2}{3}x + \frac{8}{3}$$

$$y = \frac{2}{3}x + \frac{29}{3} \quad \text{or} \quad y = \frac{2}{3}x + 9.\bar{6}$$

5. Write the equation of a line in slope-intercept form that contains
- $(-2, 5)$
- and
- $(-3, 8)$
- .

$$m = \frac{8-5}{-3-2} = \frac{3}{-1} = -3$$

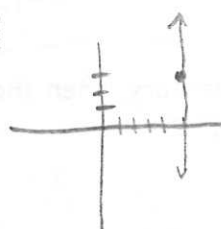
$$y - 5 = -3(x + 2)$$

$$y - 5 = -3x - 6$$

$$y = -3x - 1$$

6. Write an equation of a line that has no slope and contains
- $(5, 3)$
- .

undefined



$$x = 5$$

7. Morgan can type 174 words in 3 minutes. After 6 minutes, she had typed 348 words. Write a linear model to represent the number of words, y , that Morgan can type in x minutes.

$$(3, 174) (6, 348)$$

$$m = \frac{348 - 174}{6 - 3} = \frac{174}{3} = 58$$

$$y - 174 = 58(x - 3)$$

$$y - 174 = 58x - 174$$

$$y = 58x$$

8. Use the linear model from problem 7 to predict the number of words that Morgan can type in 8 minutes.

$$x = 8$$

$$y = 58(8)$$

$$y = 464 \text{ words}$$

9. Write an equation for an absolute value function that

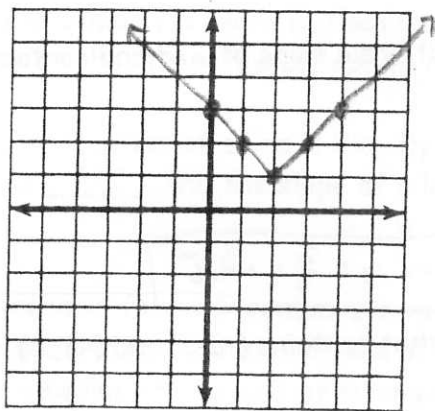
a) opens downward and has a vertex of $(7, -2)$ $y = -|x - 7| - 2$

b) translates 5 units to the right and 4 units up from the parent function $y = |x - 5| + 4$

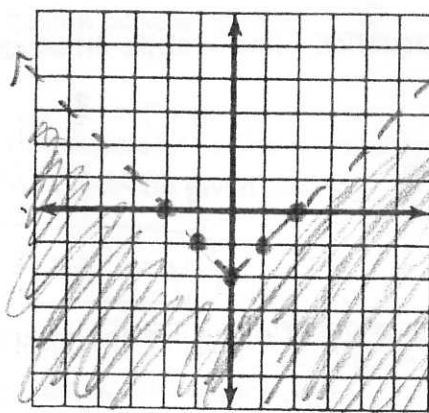
10. Graph.

a) $y = |x - 2| + 1$

x	y
0	3
1	2
2	1
3	2
4	3



b) $y < |x| - 2$ dashed!



x	y
-2	0
-1	-1
0	-2
1	-1
2	0

Solve.

11. Find three consecutive even integers where ten less than the first integer is the same as the sum of the second and third integers.

1st x

2nd $x+2$

3rd $x+4$

$$x + 2 + x + 4$$

$$x - 10 = x + 2 + x + 4$$

$$x - 10 = 2x + 6$$

$$-16 = x$$

$$-16, -14, -12$$

$$-16 - 10 = -26$$

$$-14 + -12 = -26$$

12. If two angles are complementary, then the complement is nine degrees more than twice the original angle.

90°

original x

complement $2x + 9$

$$x + 2x + 9 = 90$$

$$3x + 9 = 90$$

$$3x = 81$$

$$x = 27$$

$$x = 27^\circ$$

$$2x + 9 = 63^\circ$$

Advanced Algebra
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- The General Standard Form for a linear equation is $Ax + By = C$
- The slope formula is $m = \frac{y_2 - y_1}{x_2 - x_1}$
- Use the following words to complete each sentence: positive, negative, zero, no slope, x-intercept, y-intercept, undefined
 - The x-intercept is the point where a line intersects the x-axis.
 - The y-intercept has the coordinate (0,y).
 - If a line is horizontal, then the slope is zero
 - If a line rises to the right, then the slope is positive
 - If a line is vertical, then the slope is no slope (undefined)
 - If a line rises to the left, then the slope is negative

Write an equation of a line in slope-intercept form that meets the following conditions.

- That has the same slope as $3x - 4y = 12$ and the same y-intercept as $2x - 4y = 20$.

$$y = \frac{3}{4}x - 5$$

$$-4y = -3x + 12$$

$$y = \frac{3}{4}x - 3$$

$$-4y = -2x + 20$$

$$y = \frac{1}{2}x - 5$$

- That has an x-intercept of 4 and a y-intercept of 6.

(4,0)

(0,6)

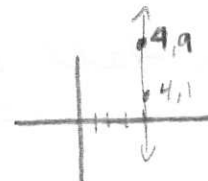
$$m = \frac{6-0}{0-4} = \frac{6}{-4} = -\frac{3}{2}$$

$$y = -\frac{3}{2}x + 6$$

- That contains the points (4, 1) and (4, 9).

$$m = \frac{9-1}{4-4} = \frac{8}{0} \Rightarrow \text{undefined}$$

$$x = 4$$



- That has the slope of 5 and contains (-2, 1)

$$\begin{aligned} y - 1 &= 5(x + 2) \\ y - 1 &= 5x + 10 \\ y &= 5x + 11 \end{aligned}$$

$$y = 5x + 11$$

- That passes through (6, -4) and is perpendicular to $2x - 3y = 3$.

$$y = -\frac{3}{5}x + 5$$

$$\begin{aligned} -3y &= -2x + 3 \\ y &= \frac{2}{3}x - 1 \end{aligned}$$

$$\begin{aligned} y + 4 &= -\frac{3}{2}(x - 6) \\ y + 4 &= -\frac{3}{2}x + 9 \\ y &= -\frac{3}{2}x + 5 \end{aligned}$$

Write an absolute value function whose graph represents the following.

9. a translation of 3 units down and 4 units to the right from $f(x) = |x|$

$$f(x) = |x-4| - 3$$

10. a translation of 2 units down and 5 units to the left from $f(x) = |x|$

$$f(x) = |x+5| - 2$$

Make a T-chart for each of the following.

11. $y = |x+5| - 2$

x	y
-3	0
-4	-1
-5	-2
-6	-1
-7	0



12. $y = -3|x-2| + 1$

x	y
0	-5
1	-2
2	1
3	-2
4	-5

13. $y = 5|x| + 3$

x	y
-2	13
-1	8
0	3
1	8
2	13

- 14a. A candle is 7 in. tall after burning 1 hour and 5 in. tall after burning 2 hours. Write a linear equation to model the height of the candle.

$(2, 5) (1, 7)$

x = time
y = height

$$m = \frac{7-5}{1-2} = \frac{2}{-1} = -2$$

$$y - 5 = -2(x - 2)$$

$$y - 5 = -2x + 4$$

$$y = -2x + 9$$

$$y = -2x + 9$$

- b. How tall will the candle be after 4 hours?

$x = 4$

$$y = -2(4) + 9$$

$$y = -8 + 9$$

$$y = 1 \text{ in}$$

- c. When will it burn out?

$y = 0$

$$0 = -2x + 9$$

$$-9 = -2x$$

$$x = 4.5 \text{ hrs}$$

- d. How tall was the candle originally?

$x = 0$

$$y = -2(0) + 9$$

$$y = 0 + 9$$

$$y = 9 \text{ in}$$

Advanced Algebra
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- The General Standard Form for a linear equation is $Ax + By = C$.
- The slope formula is $m = \frac{y_2 - y_1}{x_2 - x_1}$.
- Use the following words to complete each sentence: positive, negative, zero, no slope, x-intercept, y-intercept undefined
 - The x-int is the point where a line intersects the x-axis.
 - The y-int has the coordinate (0,y).
 - If a line is horizontal, then the slope is 0.
 - If a line rises to the right, then the slope is pos.
 - If a line is vertical, then the slope is und/no slope.
 - If a line rises to the left, then the slope is neg.

Write an equation of a line in slope intercept form that meets the following conditions.

- That has the same slope as $3x - 4y = 12$ and the same y-intercept as $2x - 4y = 20$.

$$m = \frac{3}{4} \quad b = -5$$

$$y = \frac{3}{4}x - 5$$

- That has an x-intercept of 4 and a y-intercept of 6.



$$m = -\frac{3}{2}$$

$$y = -\frac{3}{2}x + 6$$

- That contains the points (4, 1) and (4, 9).

$$\frac{8}{0}$$

$$x = 4$$

- That has the slope of 5 and contains (-2, 1)

$$y - 1 = 5(x + 2)$$

$$y - 1 = 5x + 10$$

$$y = 5x + 11$$

- That passes through (6, -4) and is perpendicular to $2x - 3y = 3$.

$$y + 4 = -\frac{3}{2}(x - 6) = y + 4 = -\frac{3}{2}x + 9$$

$$-\frac{3}{2}$$

$$y = -\frac{3}{2}x + 5$$

Write an absolute value function whose graph represents the following.

9. a translation of 3 units down and 4 units to the right from $f(x) = |x|$

$$f(x) = |x - 4| - 3$$

10. a translation of 2 units down and 5 units to the left from $f(x) = |x|$

$$y = |x + 5| - 2$$

Make a T-chart for each of the following.

11. $y = |x + 5| - 2$

12. $y = -3|x - 2| + 1$

13. $y = 5|x| + 3$

x	y
-3	0
-4	-1
-5	-2
-6	-1
-7	0

$$\begin{aligned} 1-3+5|-2 &\rightarrow |2|-2=0 \\ 1-4+5|-2 & \quad 1|-2=-1 \\ 1-5+5|-2 & \quad 1|-2=-2 \end{aligned}$$

x	y
0	-5
1	-2
2	1
3	-2
4	-5

x	y
-2	13
-1	8
0	3
1	8
2	13

14a. A candle is 7 in. tall after burning 1 hour and 5 in. tall after burning 2 hours. Write a linear equation to model the height of the candle.

$$(1, 7) \quad (2, 5)$$

$$y - 7 = -2(x - 1)$$

$$y - 7 = -2x + 2$$

$$y = -2x + 9$$

$$m = -\frac{2}{1}$$

b. How tall will the candle be after 4 hours?

$$y = -2(4) + 9$$

$$y = 1$$

1 in

c. When will it burn out?

$$0 = -2x + 9$$

$$-9 = -2x$$

4.5 hrs

d. How tall was the candle originally?

9 inches